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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/712,093	11/14/2003	Gautam Parthasarathy	134661	8210

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GENERAL ELECTRIC COMPANY
GLOBAL RESEARCH
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NISKAYUNA, NY 12309

EXAMINER	
RAABE, CHRISTOPHER M	
ART UNIT	**PAPER NUMBER**
2879	

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	01/29/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary	Application No.	Applicant(s)	
	10/712,093	PARTHASARATHY ET AL.	
	Examiner	Art Unit	
	Christopher M. Raabe	2879	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *19 September 2006*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-14* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *10/31/06*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

1. Applicant's submission, filed September 19, 2006 has been entered and acknowledged by the examiner.

2. Applicant's arguments filed September 19, 2006 have been fully considered but they are not persuasive.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1,2,4-6,8,9,11-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. (USPN 2002/0084464) in view of Andersson et al. (USPN 6117567).

With regard to claim 1,

Yamazaki et al. disclose an organic light emitting device capable of white light emissions, the device comprising at least one light emissive layer and at least one small molecule material in two layers adjacent to each other, wherein the at least one small molecule material has a wide enough bandgap and a high enough electron mobility to function as both a hole blocking layer and an electron transport layer (513,514 of fig 11B).

Yamazaki et al. do not disclose the light emissive layer to be a light emissive polymer.

Andersson et al. do disclose an oled wherein the light emissive layer is a light emissive polymer (column 1, lines 10-20, 45-47) capable of forming an exciplex with the small molecule material of Yamazaki (BCP), which is more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

With regard to claim 2,

Yamazaki et al. disclose the organic light-emitting device.

Yamazaki et al. do not disclose the light emissive layer to be a light emissive polymer.

Andersson et al. do disclose wherein a light emissive polymer comprises a polyfluorene-based blue light emissive polymer (column 1, lines 45-47), which is more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

With regard to claim 4,

Yamazaki et al. disclose the organic light emitting device, wherein the at least one small molecule material comprises bathocuproine (BCP) (514 of fig 11B).

With regard to claim 5,

Yamazaki et al. disclose the organic light emitting device. The phrase "wherein the at least one light emissive polymer is formed by a solution-cast process and the at least one small molecule material is formed by an evaporation process" does not structurally distinguish the claimed invention from the prior art, as is required of apparatus claims (MPEP 2114).

With regard to claim 6,

Yamazaki et al. disclose the organic light emitting device, wherein the device has a multilayer structure on a substrate, the multilayer structure comprising a plurality of layers starting from the substrate in the following order: (a) an anode (510 of fig 11B); (b) at least one hole injection layer or hole transport layer (511,512 of fig 11B); (c) the at least one light emissive layer (513 of fig 11B); (d) the at least one small molecule material (514 of fig 11B); (e) one or more electron transport layers (514, 515 of fig 11B); and (f) a cathode (516 of fig 11B).

Yamazaki et al. do not disclose the light emissive layer to be a light emissive polymer.

Andersson et al. do disclose an oled wherein the light emissive layer is a light emissive polymer (column 1, lines 10-20), which is more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

With regard to claim 8,

Yamazaki et al. disclose a method for making an organic light emitting device capable of white light emissions, the method comprising: forming a bi-layer comprising a light emissive layer and a small molecule material in two layers adjacent to each other, wherein the small molecule material has a wide enough bandgap and a high enough electron mobility to function as both a hole-blocking layer and an electron transport layer (514,515 of fig 11B); and incorporating the bi-layer into an organic light emitting device (figs 12A-12F).

Yamazaki et al. do not disclose the light emissive layer to be a light emissive polymer.

Andersson et al. do disclose an oled wherein the light emissive layer is a light emissive polymer (column 1, lines 10-20, 45-47) capable of forming an exciplex with the small-molecule material of Yamazaki (BCP), which is more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

With regard to claim 9,

Yamazaki et al. disclose the method.

Yamazaki et al. do not disclose the light emissive layer to be a light emissive polymer.

Andersson et al. do disclose wherein a light emissive polymer comprises a polyfluorene-based blue light emissive polymer (column 1, lines 45-47), which is more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

With regard to claim 11,

Yamazaki et al. disclose the method, wherein the small molecule material comprises bathocuproine (BCP) (514 of fig 11B).

With regard to claim 12,

Yamazaki et al. disclose the method, wherein the light emissive layer is formed by a solution-cast process (paragraph 65) and the small molecule material is formed by an evaporation process (paragraph 66).

Yamazaki et al. do not disclose the light emissive layer to be a light emissive polymer.

Andersson et al. do disclose an oled wherein the light emissive layer is a light emissive polymer (column 1, lines 10-20), which is more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

With regard to claim 13,

The method according to claim 8 further comprising forming a multilayer structure on a substrate, the multilayer structure comprising a plurality of layers starting from the substrate in the following order: (a) an anode (510 of fig 11B); (b) at least one hole injection layer hole transport layer (511,512 of fig 11B); (c) the at least one light emissive layer (513 of fig 11B); (d) the at least one small molecule material (514 of fig 11B); (e) one or more electron transport layers (514, 515 of fig 11B); and (f) a cathode (516 of fig 11B).

Yamazaki et al. do not disclose the light emissive layer to be a light emissive polymer.

Andersson et al. do disclose an oled wherein the light emissive layer is a light emissive polymer (column 1, lines 10-20), which is more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

5. Claims 3,10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. and Andersson et al. as applied to claims 1,8 above, and further in view of Adachi et al. (USPN 2002/0113545).

With regard to claim 3,

Yamazaki et al. disclose the device.

Yamazaki et al. do not disclose the LUMO values of the layers.

Adachi et al. do disclose an organic light emitting device, wherein a small molecule material has a lowest unoccupied molecular orbital (LUMO) value between the LUMO values of two adjacent layers of the at least one small molecule material (Device II of fig 1), which provides a hole blocking layer that can effectively act as an electron transport layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the LUMO relationship disclosed by Adachi et al. into the device of Yamazaki et al. in order to provide a hole blocking layer that can effectively act as an electron transport layer.

With regard to claim 10,

Yamazaki et al. disclose the method.

Yamazaki et al. do not disclose the LUMO values of the layers.

Adachi et al. do disclose an organic light emitting device, wherein a small molecule material has a lowest unoccupied molecular orbital (LUMO) value between the LUMO values of two adjacent layers of the at least one small molecule material (Device II of fig 1) which provides a hole blocking layer that can effectively act as an electron transport layer.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the LUMO relationship disclosed by Adachi et al. into the method of Yamazaki et al. in order to provide a hole blocking layer that can effectively act as an electron transport layer.

6. Claims 7,14 rejected under 35 U.S.C. 103(a) as being unpatentable over Yamazaki et al. and Andersson et al. as applied to claims 1,8 above, and further in view of Koyama (USPN 2001/0002703).

With regard to claim 7,

Yamazaki et al. disclose the organic light emitting device, wherein the device has a multilayer structure on a substrate, the multilayer structure comprising a plurality of materials starting from the substrate in the following order: (a) indium tin oxide (ITO) (520 of fig 11C); (b) polyethylenedioxythiophene (PDOT) (521 of fig 11C); (c) a light emissive layer (523 of fig 11C); (d) bathocuproine (BCP) (524 of fig 11C); (e) tris(8-hydroxy-quinoline)aluminum (Alq_3) (525 of fig 11C); (f) a cathode (526 of fig 11C).

Yamazaki et al. do not disclose the light emissive layer to be a polyfluorene-based blue light-emitting polymer, nor the cathode layer to be a layer of sodium fluoride or lithium fluoride and a layer of aluminum.

Andersson et al. do disclose wherein a light emissive polymer comprises a polyfluorene-based blue light emissive polymer (column 1, lines 45-47), which can be more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the device of Yamazaki et al. in order to more reliably form the light emitting layer.

Koyama does disclose a cathode layer to be a layer of sodium fluoride or lithium fluoride and a layer of aluminum (paragraph 207), which is more cost effective than a Yb cathode.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the cathode layer of Koyama into the device of Yamazaki et al. in order to utilize more cost-effective materials.

With regard to claim 14,

Yamazaki et al. disclose the method further comprising forming a multilayer structure on a glass substrate, the multilayer structure comprising a plurality of materials starting from the glass substrate in the following order: (a) indium tin oxide (ITO) (520 of fig 11C); (b) polyethylenedioxythiophene (PDOT) (521 of fig 11C); (c) a light emissive layer (523 of fig 11C); (d) bathocuproine (BCP) (524 of fig 11C); (e) tris(8-hydroxy-quinoline)aluminum (Alq_3) (525 of fig 11C); (f) a cathode (526 of fig 11C).

Yamazaki et al. do not disclose the light emissive layer to be a polyfluorene-based blue light-emitting polymer, nor the cathode layer to be a layer of sodium fluoride or lithium fluoride and a layer of aluminum.

Andersson et al. do disclose wherein a light emissive polymer comprises a polyfluorene-based blue light emissive polymer (column 1, lines 45-47), which can be more reliably formed.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the use of a polymer, as disclosed by Andersson, into the method of Yamazaki et al. in order to more reliably form the light emitting layer.

Koyama does disclose a cathode layer to be a layer of sodium fluoride or lithium fluoride and a layer of aluminum (paragraph 207), which is more cost-effective than a Yb cathode.

It would have been obvious to one of ordinary skill in the art at the time of the invention to incorporate the cathode layer of Koyama into the method of Yamazaki et al. in order to utilize more cost-effective materials.

Response to Arguments

7. In response to applicant's argument that neither Andersson nor Yamazaki suggest combining the features for the formation of an exciplex, the fact that applicant has recognized another advantage which would flow naturally from following the suggestion of the prior art cannot be the basis for patentability when the differences would otherwise be obvious. See *Ex parte Obiaya*, 227 USPQ 58, 60 (Bd. Pat. App. & Inter. 1985).

In response to applicant's arguments against the references individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

Additionally, while the applicant argues that Yamazaki et al. do not explicitly disclose that the device is capable of white light emission, the examiner asserts that this is disclosed in paragraph 120.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christopher M. Raabe whose telephone number is 571-272-8434. The examiner can normally be reached on m-f 7am-3:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on 571-272-2457. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CR

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PRIMARY EXAMINER